

In the Claims:

(1) A balancer for use in combination with a rotating assembly, said balancer comprising:

at least one movable member which is removably deployed upon said
5 rotating assembly and which is effective to selectively balance said rotating
assembly; and

a controller, coupled to said movable member and adapted to calculate an
influence coefficient value and to periodically modify said influence coefficient
value and to cause said movable member to move in accordance with said
10 calculated influence coefficient value and said modified value effective to balance
said rotating assembly.

(2) A balancer for use in combination with a tool assembly of a certain type and
which moves at a certain speed, said balancer comprising:

at least one movable member which is removable deployed upon said tool
15 assembly and which is effective to selectively balance said tool assembly;

a vibration sensor which senses a first amount of vibration of said tool assembly;
and

a controller, coupled to said at least one movable member and to said vibration
sensor said controller being adapted to recognize said certain type and based upon said
20 certain type to calculate a second amount of vibration and to compare said first amount of
vibration with said second amount of vibration and to move said tool assembly effective
to reduce said first amount of vibration when said first amount of vibration exceeds said
second amount of vibration.

(3) A balancer for use in combination with a tool assembly and which moves at a certain speed, said balancer comprising:

at least one movable member which is removably deployed upon said tool assembly and which is effective to selectively balance said tool assembly;

5 a vibration sensor which senses a first amount of vibration of said tool assembly in combination with some certain measurement noise; and

a controller, coupled to said at least one movable member and to said vibration sensor said controller being adapted to recognize said certain measurement noise and based upon certain measurement noise to calculate a second amount of vibration and to
10 compare said first amount of vibration with said second amount of vibration and to move said tool assembly effective to reduce said first amount of vibration when said first amount of vibration exceeds said second amount of vibration.

(4) A balancer for use in combination with a tool assembly, which moves at a certain speed and which vibrates with a certain vibration level, said balancer comprising:

15 at least one movable member movably deployed upon said balancer; and

a controller operatively connected to said first and to said second movable members and adapted to move at least one movable member effective to balance said tool assembly without substantially increasing said vibration level.

(5) A balancer adapted for use upon a moving member, said balancer comprising:

20 a movable member adapted to selectively balance said moving member upon the occurrence of a certain level of vibration of said moving member which exceeds a certain amount; and

a controller adapted to periodically change said certain amount.

(6) A method of balancing a tool assembly by selectively employing a balance weight correction to said tool assembly, said method comprising the steps of:

employing a first balance weight correction to said tool assembly;

measuring an amount of vibration associated with said balance tool assembly;

5 estimating an influence coefficient value of said tool assembly by use of variable parameters;

dividing said measured amount of vibration by said estimate influence coefficient thereby creating a certain value;

10 multiplying said certain value by a gain parameter value, thereby creating a second certain value;

subtracting said second certain value from said first balance weight correction;

and

applying said new balance weight correction to said tool assembly.

(7) The method of Claim 5 wherein said step of estimating said influence coefficient
15 comprises the steps of:

providing a previously estimated influence coefficient value;

calculating a currently estimated influence coefficient value;

20 multiplying said currently estimated influence coefficient by a certain value, thereby creating a first new value;

subtracting said certain value from one, thereby creating a second new value;

25 multiplying said previously estimated influence coefficient value by said second new value, thereby creating a third new value; and

adding said second new value to said third new value.

- (8) The method of claim 6 wherein said certain value equals zero.
- (9) The method of Claim 6 where said certain value equals one.
- (10) The method of Claim 6 wherein said certain value equals a value between zero and one.
- 5 (11) A method of balancing a tool assembly comprising:
- calculating a normalized measure of influence coefficient estimation convergence error;
- defining at least one parameter as a function of said normalized measure of influence coefficient error;
- 10 providing a balancing rotor;
- movably placing said balancing rotor upon said tool assembly; and
- moving said balancing rotor in accordance with said at least one parameter thereby balancing said tool assembly.
- (12) The method of Claim 11 wherein said function is exponential.
- 15 (13) A method to correct a certain amount of unbalance of a rotating member, said method comprising the steps of:
- calculating said certain amount of unbalance correction;
- reducing said calculated certain amount of unbalance correction by a second certain amount; and
- 20 applying said second certain amount of unbalance correction to said rotating member.
- (14) A balancer adapted for use upon a rotating member, said balancer comprising:
- First and second movable members deployed upon said rotating member; and

a controller, coupled to said first and second moveable members and which is adapted to move said movable members to substantially prevent an increase in the vibration level during the balancing of said rotating member.

(15) The balancer of Claim 14 wherein said controller is further adapted to provide a
5 sequence of movements of said first and second movable members effective to allow the estimate of an influence coefficient measure of said rotating member to be made.

(16) The balancer of Claim 14 where said controller is further adapted to dynamically change said sequence of movements to a new sequence of movement depending upon a measured amount of vibration.

10 (17) A balancer assembly having a plurality of vibration sensors, each of said vibration sensors generating a vibration signal, said balancer assembly adapted to allow a user to specify which of said vibration signals are to be minimized as a balance correction is made.

(18) A balancer which selectively balances a rotating assembly which vibrates in
15 response to a certain amount of unbalancing, said balancer comprising:

a plurality of sensors, each of said sensors generating a vibration signal;

at least one moveable member deployed upon said rotating assembly; and

a controller adapted to selectively move said movable member to a position which minimizes the combination of the amount of vibration of said rotating assembly,

20 the amount of unbalance correction and a time period in which said unbalance correction is applied to said rotating assembly.